Cube 6 With Cube Cloud Services

presented to
Florida Model Task Force

presented by
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Citilabs – the Company
Who We Are

- Developers of transportation systems modeling software

- Offices
  - USA : Tallahassee, San Francisco, Hartford
  - Europe : Paris, Milan
  - Asia : Beijing, Mumbai

- 2,500 cities on 6 continents in more than 70 countries
Citilabs – the Company
Who Uses Our Products

- **North America**
  - Los Angeles, Houston, Miami, Orlando, Washington, Atlanta, San Francisco, Minneapolis, St. Louis, Tampa, Baltimore, Pittsburgh, Cincinnati, Sacramento

- **Europe**

- **Asia-Pacific**
  - Melbourne, Adelaide, Perth, Brisbane, Seoul, Beijing, Bangkok, Hong Kong, Singapore, Kuala Lumpur, Manila, Jakarta, Delhi
Citilabs
Software Products

**Cube 6**
Desktop Transportation Modeling + Cloud Computing
- a comprehensive suite for passenger, freight, land use, and traffic simulation

**Sugar**
Extension for ArcGIS
- Multimodal transportation network editor

**accession**
Transportation Accessibility Analysis
- Network accessibility and travel time mapping
Cube: Professional Desktop Modeling Suite

Cube Base – the system interface
- Includes ArcGIS Engine and Python (optional)
- Required for all modules except Cube Dynasim
- Available as a standalone model viewer/editor

Cube Voyager – the modeling engine
- Cube Cluster – distributed computing controller
- Cube Avenue – DTA and traffic simulation

Cube Dynasim – micro-simulation package
- Includes 3D viewer, transit and pedestrians

Cube Analyst – matrix estimation
- New: dynamic ODME, parallel computing

Cube Land – socio-economic forecasting

Cube Cargo – freight forecasting
The Ribbon is designed to help you quickly find the commands that you need.

Commands organized in logical groups, collected together under tabs. Each tab is related to a type of activity such as:

- Scenario
- Intersections
- Analysis

Some tabs are shown only when needed.
Docking Windows

The ‘side’ windows from Scenario Manager (scenario, data, application, keys..) are now fully dockable, collapsible and have auto-hide functionality
New Script Text Editor

- Smart ‘autocomplete’ for commands and keys
- Column mode editing
- Search and replace with bookmark support
- Line numbers
- Code bookmarks
- Collapsible comment ‘groups’
- Zooming functionality
- Incorporation of ‘tab’
- Color themes
What hasn’t changed...
Built for Scenario Testing

Easy to use environment to create, test, manage and analyze scenarios.

Menus to prompt user for inputs and parameters of test

Integrated report and charting generators to assist in the analysis
The Flow-Chart: Easy Model Development

Famous flow-chart environment for designing and building transportation models.

- Modules are accessed through pull-down menus
- Dropped into a flow chart
- Data inputs and outputs linked by drag-and-drop.
Cube Voyager Script: Power and Flexibility

The only system equipped with its own comprehensive scripting language designed specifically for transportation modeling

- Create customized models without difficult programming languages
- Access many scripts through simple menu clicks

```bash
; ----- CHECK TRANSIT LINES AND STORE BOARDINGS FOR PEAK DRIVE-ACCESS
cur_line=''
trn_idx=1
loop _ii=1,db1.2.numrecords
  if (db2.stopa[_ii]=1)
    if (ltrim(trim(cur_line))!=ltrim(trim(db2.name[_ii])))
      cur_line=ltrim(trim(db2.name[_ii]))
      line_flag=0
      loop _jj=trx_idx,db5.numrecords
        if (ltrim(trim(cur_line))!=ltrim(trim(db5.name[_jj])))
          line_flag=1
          break
      endif
    endif
  endif
  ; ADD-UP BOARDING FOR CURRENT STOP INTO CURRENT TRANSIT LINE
  trn_onl[trx_idx]=trn_onl[trx_idx]+db1.ona[_ii]
end loop

; INITIALIZE CURRENT TRANSIT LINE NAME VARIABLE
; INITIALIZE CURRENT TRANSIT LINE INDEX VARIABLE
; CUMULATE BOARDINGS FOR ONLY TRANSIT STOP (STOPA=1)
; UPDATE CURRENT TRANSIT LINE NAME IF CURRENT RECORD INCLUDES NEXT TRANSIT LINE NAME
; INITIALIZE TRANSIT LINE NAME SEARCHING VARIABLE (0=ERROR, 1=FOUND)
; SEARCH EXISTENCE OF TRANSIT LINE NAME
; IF FOUND, SET NAME SEARCHING VARIABLE AS 1
; IF FOUND, EXIT LOOP OF SEARCHING TRANSIT LINE NAME
; PRINT IF CURRENT TRANSIT LINE IS NOT FOUND
```

```bash
endif
end
```

```bash
; UPDATE INDEX FOR STARTING NEXT TRANSIT LINE
```
Nashville Activity-Based Model

Cube Cluster
Provides the ability to spread calculations across not only multiple processors but multiple computers as well.

Run Times (Hours)

99% reduction off single core
Only modeling system that comes with a complete transportation GIS built on ESRI’s market leading GIS technology.

Store all data directly in ESRI’s geodatabase format.

No need to convert data back and forth between the GIS department and the modeling team.

ArcGIS Extension for network editing (Sugar)
Computer servers not located in your office or home—but in another location

You access these computers and storage through the internet

The computation, software, data and storage services do not require knowledge of the physical location and configuration of the system that delivers the services.

Parallels to this concept can be drawn with the electricity grid
Cube Cloud Services
TRAVEL MODEL
Amazon’s EC2 Cloud Computing Environment

- Develop the Model with Cube in the Desktop Environment
- Publish the Model from Cube to the Cube Cloud Services
- Create, run and analyze scenarios from anywhere
Benefits of CCS: Sharing

- You own the model
- You invite others to use it
- No more physical copy of scripts and models
  - Eliminate onerous, mistake prone process
  - Eliminate problems with version control
  - Protect model integrity by not sharing scripts
  - Protect intellectual property by not showing scripts
- Users run the model through simple web-interface
- True solution for sharing and maintaining model(s) with multiple users and for delivering a turn-key solution
- Sharing = Value Creation

Happy people share
Speed

- Inherent utilization of Cube Cluster

- Model Administrators choose how many cores make sense for their models
  - Choose from 1 to 1001 cores

- Runtimes ‘charged’ in core-hours.
Scalability

- Any number of Users…
- Any number of Scenarios…
- All running simultaneously…
- One preconfigured machine ‘image’
  - No model distribution, setup, or support
  - Guaranteed consistent results
  - Only pay for what you use

Suddenly, there are no hardware constraints… Spend your time analyzing results. Not running a model!
Manage Access Through Administrator Control Panel

![Screenshot of the administrator control panel](image)

**Manage Model Access**

Model: Olympus

<table>
<thead>
<tr>
<th>Username</th>
<th>Email</th>
<th>Pay for User Runs</th>
<th>Is Model Admin?</th>
</tr>
</thead>
<tbody>
<tr>
<td>CitilabsAdmin x</td>
<td><a href="mailto:amohideen@citiabs.com">amohideen@citiabs.com</a></td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>colbybrown x</td>
<td><a href="mailto:cbrown@citiabs.com">cbrown@citiabs.com</a></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>mmartimo x</td>
<td><a href="mailto:mmartimo@citiabs.com">mmartimo@citiabs.com</a></td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

**Help - Manage Model Access**

From this screen, you can manage the users who currently have access to the selected model. The Username, Email Address, Catalog Group, and Authorizing Agency of each user are displayed.

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Run Scenarios With a Simple Web-Based Interface
Web-Based Mapping of Model Results
Easy to Use Charts and Graphs
Improve Accessibility and Security

- Access the model through a common web browser
- Work from anywhere at anytime
- Work effectively as teams
- Protect the data and models with safe, off-site storage with redundant data backup
It’s Cheaper Than the Desktop

- Eliminate expensive hardware costs
- Spend your time on forecasting and not IT
- Cube software is included on the cloud
- Reduce costs to share and maintain the model through web-based control panels
- Reduce training costs—simple interface
FLSWM

- Statewide model
- 6,242 zones
- Passenger and freight modeling
- 4 user classes
FLSWM

Run Times (Hours)

1. 11.4
2. 3.3
3. 2.3
4. 2.1

Number of Cores

Hours

72% reduction off single core